

# Handbook

## for Agroforestry Planning & Design



**The Center for Agroforestry  
University of Missouri**

*Michael Gold, Mihaela Cernusca & Michelle Hall, Eds.*

# Planning for Agroforestry

Developing a plan may seem tedious at the beginning, but the long-term benefits far outweigh the difficulties of plan creation. By having a plan, landowners can better envision how to successfully integrate an agroforestry practice to their farm. And, the planning process also will help develop a familiarity with the management required to reach the goals, objectives, benefits and economics desired. The best way to ensure success is by thoughtful and honest planning.

## Why Plan?

The development of a plan for integrating agroforestry practices to the farm system is as important as the actual establishment of the practice itself. Planning – and the development of a timeline – will help maximize the chances for the success of the agroforestry practice. Planning will not only assist in understanding how the practice and its placement on the landscape can accomplish specific on-farm goals, but also will provide assistance in identifying market opportunities for products that may be grown in the practice. ***Remember: Diagnosis precedes treatment.***

The culmination of the planning process is the development of a 5-year management and activities schedule. This final, yet very important step, will help line out the inputs needed over time to keep the agroforestry practice a meaningful and productive component of the farm system for years to come.

This Handbook is your primary agroforestry planning tool. Coupled with the Workbook, this first section is designed to help guide you through the various stages of creating a plan for your agroforestry development area(s), and will assist you in gathering information on:

- *Your objectives and priorities.*
- *Personal resources (e.g., labor, equipment, buildings, animals, plants).*
- *Climate, soil conditions and physical features.*
- *Current land use.*
- *Land available to practice agroforestry.*
- *A non-timber plant inventory (for woodland only).*
- *Market conditions for potential products.*

Together with the Training Manual for Applied Agroforestry Practices (Training Manual), the steps provided in this handbook will allow you to identify what agroforestry products can grow on your land, which of these products you can sell profitably, and how to develop basic business and marketing strategies. The final steps are a five-year development plan and yearly activity schedule, outlining the work you plan to do to establish your agroforestry development(s). The time you put into researching, preparing and following your plan is an investment in your future agroforestry success.

The steps presented in the following pages – designed to guide you in creating an agroforestry plan – are often inter-related, and information gathered in one step will likely impact information gathered in other steps. For this reason, the creation of your plan will likely require you to revisit (and expand) each step as you learn more and develop new ideas.

**Note:** The succession of steps has been organized to help you develop your agroforestry plan logically. You need not complete each step in the order they are presented. You may prefer to gather information in a way that best suits your circumstances.

In addition to identifying available resources, site conditions and marketable plants, getting through the steps and filling in the Workbook forms will help you explore and articulate your values and attitudes. Every landowner will have different personal and production goals for an agroforestry development, and your plan for your land will be different from someone across the country, state, or even across the road. To accommodate these differences,

this guide is not based on a single set of goals. Instead, it has been developed to provide a set of tools that you can use to make informed decisions in creating a profitable agroforestry business.

An agroforestry development plan is based on the capability of your land, your personal goals, your business goals, and your land stewardship objectives. These goals and objectives will be re-assessed and changed as you obtain new information during the planning and initiation of an agroforestry development. Agroforestry practices are always changing, and understanding and working with change will help you best achieve your goals.

There are many sources of information and advice available to assist you with your agroforestry development. Since agroforestry practices often involve various fields (e.g., forestry, agronomy, animal husbandry, horticulture, soil science, marketing) you may have to augment your personal knowledge. Sources listed at the end of each chapter in the Training Manual are designed to guide you.

## How to Proceed

This handbook contains the steps for developing an agroforestry plan and workbook. The forms in the workbook can be photocopied as needed. The information, tools and links you need to complete the agroforestry plan are found in chapters 3-10 of the Training Manual.

It is recommended that you read through these steps before you begin to write down information in the corresponding sections of the Workbook.

**Note:** Depending on the size of your property, you may have one or more areas on which you want to develop agroforestry practices. Planning will be easier if you prepare separate forms for each separate development area, especially if potential agroforestry development areas have different site conditions and current uses.

# Steps for Developing an Agroforestry Plan

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## **Biophysical Site Assessment**

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Step 4: Map Area(s) for Agroforestry Development

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## Step 1: Initial Objectives and Priorities

Landowners exploring multiple uses for their property face many preliminary decisions. Not least, if you have a number of different objectives for an area, some may seem to be in conflict. The choices each landowner makes reflect a set of individual values and attitudes. Your personal and business goals become the criteria for assessing the different possibilities for your land.

Your land management objectives and priorities will be specific to your circumstances and the area you want to develop for agroforestry. ***However, among other possibilities, you may want to:***

- *Develop a new source of income from unproductive land (diversification).*
- *Reduce costs of an existing farm or forest operation.*
- *Develop a source of long-term income.*
- *Develop a source of short-term income while awaiting long-term income from timber.*
- *Reduce property taxes.*
- *Protect or improve environmental conditions.*
- *Increase grazing opportunities.*

Turn to the Workbook and complete the table of initial objectives and priorities. Remember that these initial objectives may change as you learn more about your land and your agroforestry business. After you finish this assessment, you will be able to weigh your objectives against what you can actually produce on each area of your land.

## Step 2: Evaluate Personal Resources

In addition to your land base, your agroforestry development will require the input of other personal resources. An evaluation of the resources available to you will help determine which agroforestry options are best suited to your operation. An evaluation should include:

**Management and labor availability** – Periods during which you are not busy (between or after harvests) and the periods during which labor and management time will be committed to other activities.

**Equipment and buildings** – Buildings and equipment, including machines and hand tools, that can be used for this development.

**Livestock** – Your operation may already have cattle, sheep or other animals.

**Plant material** – Your own sources of seed, seedlings, cuttings and larger trees.

**Other materials** – Resources such as sawdust or shavings, manure and straw for mulch.

List these personal resources, as well as anything else that you consider of importance, in the table provided in the Workbook.

### Step 3: Identify Current Land Uses

List the present uses of each area of your land and the products you harvest, and record them in your Workbook. These uses could include:

- Residential
- Recreational
- Farming (which crops)
- Grazing (type of livestock)
- Timber production
- Non-timber production
- Environmental use

### Step 4: Map Area(s) for Agroforestry Development

An agroforestry development may include all of your land or only specific areas, such as existing woodlands, open field, logged-over area or riparian zone. In either case, identifying objectives and making decisions will be much easier if you break your land into separate development areas with similar current uses and site conditions (such as soil, moisture and existing plants). Steps in the Workbook, including the sketch map, should be completed for each separate development area. Pages of the Workbook can be copied for this purpose.

### *For each agroforestry development area, you should:*

- Draw a sketch map of the area you are targeting for agroforestry development. Using the legend provided in the Workbook, indicate boundary lines, main geographic features, houses, other buildings and roads.
- Identify and measure the area approximately, marking these measurements on the sketch. This will help determine planting requirements and potential crop production.

There is some overlap between Step 3 and Step 4, since you will indicate these uses on your sketch map. Step 3 gives an opportunity to provide information on land use in greater detail, and by thinking about land uses, you may decide to modify your sketch map.

## Why Assess Your Land?

Assess climate, soil and physical features on each site on which you intend to develop an agroforestry practice. These assessments will allow you to determine:

- Which plants you can successfully grow on each site.
- Limitations to planting and growing these plants.
- The most effective management practices.

Assessments can be as detailed as you want, or as required by the project. The introduction of long-term or special-needs crops such as black walnut trees requires a different level of site assessment than the planting of a shallow-rooted annual crop. Even if you plan to begin small, with a few tree seedlings on a fence line and a small planting of medicinal herbs, you should still assess the limitations and potential of your land.

The information provided here, and the accompanying form in the Workbook, gives a basic site assessment. More detailed assessments require added time, equipment and expertise. They are only worth doing if it will help with a critical aspect of your agroforestry development. For most developments, they are not necessary.



## Step 5: Climate Assessment

Climate on your site ultimately determines what you can grow on your land. Combining this data with the information provided in Appendices 2 and 3 of the Training Manual will establish the range of possibilities for your agroforestry practice.

**Hardiness Zone** - The U.S. Department of Agriculture Plant Hardiness Zone Map has mapped plant hardiness zones for the entire country. You can find the Plant Hardiness Zone Map for different regions of the U.S. at the USDA National Arboretum website: <http://www.usna.usda.gov/Hardzone/ushzmap.html>

To locate a Plant Hardiness Zone Map specific to your State go to the following website and click on your State: <http://www.growit.com/bin/USDASZoneMaps.exe?MyState=MO>

These zones rate the conditions affecting winter survival of plants. The primary factor is the minimum (coldest) winter temperature, with some consideration for the number of frost-free days, summer rainfall, maximum temperatures, snow cover and wind.

Most information sources, and suppliers of seeds and plants, list the minimum hardiness zone for particular plants. Plant breeding programs have resulted in cultivars or selections of many plants that differ in hardiness from their parent (check this carefully to prevent a costly error).

In some cases, the hardiness zone mapping is only an approximate guide for local conditions. Enter hardiness zone information in the table provided in the Workbook. Additional information you may find, such as frost-free days and date of soil thaw, should also be included in the table.

## Step 6: Soil Assessment

### *Land Capability Classification*

The Land Capability Classification shows, in a general way, the suitability of soils for most kinds of agricultural land use or field crops. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and

the way they respond to management. There are two principal categories in this classification system, the Capability Class and Capability Subclass.

The Land Capability Classification identifies the potential of local areas for agricultural production. County Soil Surveys contain the Land Capability Classification for all soils in your county. The County Soil Surveys also provide useful climate information.

The classes are ranked from I (highest) to VIII (lowest), but the capability subclasses refer to soil groups within a class. Classes I - IV are considered capable of the sustained production of common field crops. Crop species become limiting as the land capability declines from Class I to Class IV. Class V lands are only capable of producing perennial forage crops or specially adapted crops. Class VI lands are capable of providing sustained pasture. Class VII land are incapable of either arable culture or grazing.

**Capability Subclasses include:** (e) runoff and erosion; (w) wetness; and (s) root zone or tillage problems – shallow, droughty or stony.

List the climatic, capability rating and limiting factors for your site, as well as any other information you believe might be useful, in the table provided in your Workbook.

Soils are an extremely important feature of your land base because they are the material in which the plants of your agro-

### Soil Information Sources

Information about various versions of a soil survey can be obtained one of three ways:

- *By checking the list of published surveys on the soils web site of the USDA*
- *By contacting the appropriate state office of the NRCS*
- *By contacting the appropriate local office of the NRCS*

**Note:** Additional information about Missouri soils can be found at the Missouri Cooperative Soil Survey web site at <http://soils.missouri.edu>

forestry practice will grow. Soil survey publications represent a snapshot in time. They contain information that was current as of the indicated publication date. The text, tables and soil maps may have been updated since publication. The most up-to-date information is available on the NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>) or the Soil Data Mart (<http://soildatamart.nrcs.usda.gov/>).

Read about the soils (formation of soils), look at a soils map, then examine your soils. One way to gain an understanding of your soil is to dig several soil pits at least 18" deep, and examine your soils for several important features. However, soils are landform dependent, and samples taken should represent different landforms and positions on those landforms. It is recommended to dig one or two pits per acre, and more if the area/landform is not uniform.

***Important note:*** If you are planning to practice agroforestry on a woodland area, plan to do a plant inventory. Since this requires setting up survey plots in a grid system, you probably want to do your soil assessments at the same time as your plant inventory.

### ***Soil Texture and Composition***

Mineral soils are particles of rock or minerals produced from rock by weathering and other geological processes. Sands and gravel are the largest particles, while clay and silt soils contain the smallest particles. The finer textured soils hold more water and dry out more slowly. Organic soil layers or horizons are derived from decaying vegetation, usually in a thin layer above mineral soils. Where found in a sizable layer, they tend to retain both water and nutrients.

In your Workbook table, list the soil type(s) found in each of your agroforestry development areas, and map the locations if there is more than one type.

## ***Soil Depth***

Soil depth determines the rooting capability of the plants you may wish to grow. In particular, forest soils can be quite shallow, requiring extra care in management. You will notice distinct layers as you dig down and you may come across restricting layers such as:

1. Stones and rock outcrops that can interfere with digging and cultivation, and can reduce the nutrient and water-holding capacity of the soil. Rock outcroppings are areas with very little soil; and
2. Hardpan, a hardened layer below the surface of the soil that can prevent penetration of water and roots. Additional soil features that may be problematic include: fragipans, clay-pans, abrupt textural changes and general discontinuity. Deep-rooted plants such as alfalfa or black walnut will be severely impacted by hardpan. Neighbors and previous land-owners may know if there is a hardpan, but you may have to dig several holes to determine the extent.

Note and record in your Workbook the approximate percentage of rock fragments in the soil (stoniness), and depth and type of any restricting layers. Show their extent on the sketch map.

## ***Soil Moisture***

Soil moisture, which is key to the establishment and growth of plants, is closely linked to soil texture. The spaces (pores) between soil particles hold water and air needed by plants for good growth. Generally, coarser soils are well-drained and are often dry for longer periods, while soils with finer textures hold more water and are likely to remain moist longer. Other factors, such as ground water level or the presence of an impermeable layer that restricts drainage, also determine soil moisture.

As you dig your pit, is the soil dusty and dry? Does water seep into the bottom of the hole? Often, the time of year and recent weather will influence soil moisture.

## ***High Water Table, Standing Water or Flooding***

Areas such as wetlands and parts of riparian zones which remain fully saturated for extended periods of time are of special

concern. These areas are sensitive to access development and machine use, and are important for wildlife habitat and other environmental values. You will need to identify these areas of your land and plan to use especially careful management. Access may be limited for all or part of the year.

In your Workbook table and on your sketch map, it is important to note any: Wetland features, evidence of flooding, areas that experience overland flows or standing water during spring runoff, and areas with continual seepage or high water table.

Both very wet or dry conditions pose challenges for planting and management. However, some plants are particularly adapted to one or the other of these extremes (see Appendices 2 & 3 for a listing of suitable plants). Note the moisture conditions of various portions of your proposed development area on both your sketch map and in your Workbook table.

### **Nutrients**

The availability of nutrients in the soil affects the quantity and quality of products produced. You can undertake a soil test to determine the soil pH (acid/alkaline balance), specific nutrient levels, and recommendations for various crops. Tissue analysis is also an effective way (preferred in forest soils) to determine nutritional status of existing trees and plants. Although there are soil sampling field kits, soil and tissue samples are usually sent to a laboratory for analysis and interpretation. In your Workbook table note the status of soil nutrients that you have determined and attach any lab reports.

## **Step 7: Physical Features (Terrain)**

The physical features outlined in Step 7 are closely related to – but also different from – the soil characteristics described in Step 6. For ease-of-use, physical features are described separately from soil characteristics. However, the information you generate through each step is entered into the same table in the Workbook. This allows you to easily see the relationships between physical features and soil characteristics. There are several physical features that can influence your capability to produce particular crops on a site.

Aspect refers to the direction toward which the site slopes (if any). South and southwest-facing slopes are usually warmer and drier than those facing north, and naturally support different plant communities. Terrain relief refers to whether the site is steep, flat, sloped, rolling, gullied or broken (steep slopes between benches). This will influence access and machine capability, water management, cold air drainage, and other microclimate factors. Frost pockets are one additional feature to consider. Cold air flows downhill and pools in low areas. The resulting localized frosts can damage delicate flowers and shoots that start to grow early in the spring. Even crop plants correctly chosen for your hardiness zone can be affected. Assess low areas on your land for potential frost pockets – the absence of native berry plants can be a good indicator. Avoid these areas for frost-sensitive plants. Sloped or bench land that has good air drainage is a better choice.

Enter your observations of the physical features mentioned above in your Workbook table and on your sketch map.

## Step 8: Timber and Non-Timber Forest Crop Inventory

If you want to practice agroforestry in woodland areas, this chapter will help you inventory the variety of plants growing on your land – everything from trees to herbs on the forest floor. The inventory of trees described here is restricted to their potential production of non-timber products (e.g., medicinals, florals) and their interactions with other plants (e.g., shade, moisture, nutrients). A non-timber vegetation inventory can be used to help create a list of ‘best bets’ – plants that can be successfully grown on your land, and will also help you decide how to manage your woodland efficiently and productively (i.e., managing competition for sun, water and nutrients). There is literature available elsewhere on timber inventory methods (see Additional Resources in the Training Manual, Chapter 2).

If you own more than a few acres of land, you should sample your land base, using inventory plots to obtain a ‘best approximation’ of the vegetation. Sampling is an excellent compromise between doing nothing (and having a very limited picture of your land)

and trying to do the impossible: Counting every tree, shrub and herb on your property.

### ***A. Preparing Your Inventory***

An inventory should give you a timely snapshot of your land; it should not take too long, nor should it be too difficult. Inventory plots are the sites where you record information about vegetation and other features on your land. They form a pre-determined portion (or percentage) of the larger area you're interested in sampling. Multiplying your plot data by the number of plots that would fit in the larger area will give an estimate of what you would find if you actually measured everything. Size of inventory plots depends on what you're trying to survey and the vegetation cover on the plot. In your forest vegetation survey, you will actually take two separate surveys from the same plot center. This is because you need to collect information about two very different types of vegetation: Trees; shrubs and other smaller plants.

Plot cruises can be used to estimate the number of plants in a forest by species, diameter, height, form class and grade. All fixed plot cruises have statistical sampling error which is important to know and understand before relying on the data. A plot cruise simply consists of counting and classifying all trees or plants species in a series of circular sample plots. Circular plots are usually 1/10-acre in size (37.2 feet radius). The plots are evenly spaced throughout the stand to provide an equal sampling of all forest types across all topographic changes.

### ***B. Doing Your Inventory***

Locating your plots in the field. Following a compass line is a vital skill when conducting your vegetation inventory. It is beyond the scope of this Handbook to review compass work in detail but there are a couple of points to remember:

- The right compass for the job. Ideally, you should have a 'ranger' type with a mirror in the lid, gunsight sighting, liquid dampened needle, and an adjustment for setting declination.
- Staying on track. With a little practice, staying on your traverse line is not difficult. Hold the compass level, line up the arrow in the mirror face, sight on the farthest object you can pick out through the gunsight (e.g., recognizable tree, rock, stump), and walk toward it. When you reach that landmark, sight again and find a new object to focus on.

Obtain a good guidebook to the plants of your area. Remember that quality can have a big impact on the prices you receive for non-timber forest products. That means you will have to make judgment calls when doing your inventory. Information on product specifications – including acceptable quality – can be found in Appendices 2 and 3. It is also important to remember that you should contact buyers before you harvest, so that you can harvest to the correct specifications.

***Tree inventory.*** The tree inventory described here is only intended to determine the non-timber resources available (e.g., boughs, vines, bark, burls).

***Number of trees and species.*** Record the number of trees of each species found at the plot. This will assist in determining what non-timber products can be obtained, and what plants can be grown under the canopy.

***Tree age.*** This is optional, but can be useful to know. An increment borer is easy to use and will not harm the trees. Record the age of one or two average trees per plot.

***Tree height.*** This is also optional, and only really useful for a timber inventory. Details on calculating height can be found in the guide “Conducting a Simple Timber Inventory,” <https://uextension.tennessee.edu/publications/Documents/PB1780.pdf>

***Condition of trees.*** Helpful in determining whether marketable non-timber products can be harvested. Also helpful in assessing the possible function as a windbreak.

***Crown closure.*** The degree of canopy closure will determine the conditions for raising or enhancing shade-loving species in the under story.

## **Non-timber Inventory**

Begin your inventory by identifying and listing all the harvestable non-timber species found in the plot on your plot sheet. Include plants that provide good browse if you intend to graze the area.



***For each species, record the following:***

**Total number of plants for each species.** Where possible/feasible, count the number of individual plants of each species found in the plot. This will be easier on an open forest floor than it will be on dense sites. You may choose to record sites like the latter simply as 'dense coverage.' This is one of those instances where judgment calls come in. Even an approximate number could be useful in developing a harvesting plan.

**Estimate of the percentage cover for each species.** How much of the plot do you think the species covers? Provide an estimate to the closest 10%.

**Proportion of harvestable vs. non-harvestable individuals.**

The aim here is estimate the amount of harvestable individuals for each species (none, 20%, 50%). Your decisions will be based on factors such as size, color, and insect or other damage. If many of the plants are not harvestable in their current condition, cultural practices such as fertilization and pruning may be available that would improve product quantity and quality.

### ***C. Using Your Inventory***

First, make sure all areas inventoried are marked on your map(s). Next, you need to take the raw data from your inventory (plot sheets), compile it, and present it in a useful format. That means taking the information from your sample plots and organizing the information so it represents your entire development area.

### ***Trees and/or other resources per acre***

Among your survey information, you have recorded the number of each plant species that appears in each inventory plot. Now you want to convert that number into the number of plants per acre. This is done using the plots per acre factor. The plot information is then extrapolated to one acre and multiplied by the total acres.

For example, if you counted 10 individual witch hazel shrubs in your plot cruise

One plot on 1-acre:

Plot size 1/10-acre

Plot radius (feet) 37.2

Average trillium plants/plot 8

Factor to 1-acre, multiply times 10

Total estimated witch hazel per acre = 80

Once you know the approximate number of plants of a given species per acre you have a fairly good idea of the plant resources you have on your land. Record the information in the tables provided in the Workbook.

## Step 9: Agroforestry Development Ideas – Brainstorming

After reading the chapters 3 through 10 in the accompanying Training Manual, you will probably come up with some ideas for agroforestry developments on your property. Once you have done this, it is time to engage in some brainstorming. In addition, check out Appendices 2 (Trees and Shrubs for Agroforestry) and 3 (Grasses and Forages for Agroforestry) in the Training Manual to develop additional ideas.

Brainstorming is the process of putting ideas down on paper as they come into your head. List them all and don't try to self-censor the ideas. You can reduce this list to 'best bets' later. Input from family and friends, as well as ideas from neighboring landowners, can help generate useful ideas. This is also a point at which expert advice may expand the list of possibilities. For additional assistance consult the Additional Resources that are listed at the end of every section.

For each development area, sort the list by practice and record this information in the corresponding Workbook form. In general, more intensive agroforestry practices (e.g., forest farming) are suited for smaller units of land, while the more extensive practices (e.g., silvopasture) are suited to larger units of land.

## Step 10: Listing 'Best Bets'

The intent of this short but important step is to create a list of potential crops that can be grown on your land. This list of 'best bets' will be based on the information you have gathered so far – including land and personal resources, site conditions and current land use – combined with the plant information provided in Appendices 2 and 3 of the Training Manual.

Perhaps the easiest way to approach this list is by first determining what plants can grow under the climatic, soil and physical conditions that occur in each of your agroforestry development areas. Plants you already cultivate on your land, plants revealed by your non-timber inventory, and crop ideas you have developed while gathering information will all form part of this list.

You can add substantially to the list by looking at Appendices 2 and 3 in the Training Manual to see what other plants can be successfully grown on your site, and what products can be made from them. You want this list to be as extensive as possible, so you can consider the widest possible range of options.

Your list can be refined by considering the resources at your disposal (e.g., labor, buildings, equipment) at different times of the year. These factors will limit the crops and crop combinations you can grow. Finally, you can further refine your list by revisiting the objectives you have for your land, such as income diversification, reduction of land taxes or environmental protection.

The list of 'best bets' you make in this part of your Workbook should include all the plants that can grow on your land, and the products that can be derived. Make sure you include timber products that can be made from trees you would plant as part of an agroforestry development. If you have done a timber inventory – in addition to the non-timber vegetation inventory – list those possible timber products as well.

Along with Chapter 9 of the Training Manual, the following steps will help you develop a marketing strategy, or marketing plan. Each step contains directions needed to complete corresponding sections in your Workbook. You should note that every part of every step might not apply to your situation.

## Step 11: SWOT Analysis

Having analyzed the current situation of your farm with respect to objectives and priorities, personal resources, site assessment and vegetation inventory, and brainstormed ideas of agroforestry practices, you can use that information to identify Strengths and Weaknesses, Opportunities and Threats or a SWOT analysis for

the crops you think may produce. This can be helpful in defining and clarifying the issues you need to address in the rest of the planning process.

As detailed in the Training Manual Chapter 9, in identifying strengths and weaknesses, you will be focusing on factors internal to your business. Opportunities and threats refer to the external environment of your business. The plan you will develop will be shaped by both internal and external factors; it will build on your strengths and minimize the impacts of your weaknesses while at the same time be responsive to the opportunities and threats your environment offers.

In the SWOT Analysis worksheet, summarize the internal strengths and weaknesses and the external opportunities and threats for your business as you identify them today. Consider all aspects: natural, physical and human resources, marketing, operations and finances.

## Step 12: Porter Five Forces Model

The Five Forces Model (developed by Dr. Michael Porter of Harvard University) serves as a good framework for assessing different industries you would like to get in. The Five Forces Model identifies coordination and control aspects of an industry and provides a guideline for understanding the resources and relationships needed to be successful in a market. The model is presented in more detail in the Training Manual Chapter 9 – Marketing Principles. Using the information and examples provided in Chapter 9, use the following ideas to evaluate the chosen crops in the context of the industry:

- Identify barriers to entry.
- Identify suppliers/bargaining power of suppliers.
- Identifying buyers/bargaining power of buyers.
- Identify substitutes.
- Identify competitors and their competitive advantages.

## Step 13: Revising Your “Best Bets”

In Step 11 of your agroforestry plan, you identified the plants that can grow on your land, and which you can produce with the resources you have available.

After a thorough analysis using the SWOT Analysis and Porter Five Forces Model, the list of 'best bets' can be refined to include those plants and products you think have the best market potential. When selecting a list of marketable 'best bets,' consider:

- How difficult is it to enter the market?
- Is the required supply available?
- Are there buyers nearby?
- What is the demand for the crop, relative to supply?
- How does harvesting and selling these crops fit in with the rest of your production system? For example, will the crop(s) require big inputs of labor during an already busy period?
- Is investment of resources (labor and capital) likely to provide an adequate return?
- How does that return compare to other possible crop/product options?

Where possible, use your vegetation inventory information to list the approximate volumes of the crops you have for sale. For crops not yet planted, you should estimate how much you'll be able to sell so you have an idea of how much to plant.

Refer to Chapter 9 – Marketing Principles in your Training Manual to develop the following steps (14 to 18). In these steps you will be creating a marketing strategy.

Your marketing strategy is about defining your customer or target market and tailoring your product, pricing, distribution and promotion strategies to satisfy that target market.

## Step 14: Select and Describe Target Market(s)

Your first task in building a customer strategy is to identify your target market. Target markets are most commonly characterized as either individual households or businesses. Begin your target market research by developing a customer profile. Customer profiles can help you determine if a market segment is large enough to be profitable. Break your target market up into segments based on differences in their geographic location, demographic characteristics, social class, personality, buying behavior or benefits sought.

**Example:**

Product: Elderberry jelly

Customer segments:

*1. Farmers markets customers*

Geographic: Local area

Demographic: Mostly female, mid-age, moderate to high household income

Psychographic: Support for local agriculture, health conscious

Needs/Preferences: Prefer locally produced food, fresh food, convenience

*2. Online customers*

Geographic: Nation-wide (USA)

Demographic: Younger, moderate to high household income, high level of education

Psychographic: Price sensitive

Needs/Preferences: Like the comfort of shopping from home

*3. Health food stores customers*

Geographic: Regional area

Demographic: Older, higher household income, high level of education

Psychographic: Health conscious, less price sensitive

Needs/Preferences: Prefer healthy, high quality products

## Step 15: Adding Value to Products

As you think about the products your business will offer, try to describe them in terms of the value they will bring to your customers. List all value-added opportunities and identify 'pros' (how it will benefit the needs of each customer segment) and 'cons' (e.g., costs, risks) for each of them. Identify also unique characteristics that will differentiate your product from competitors. Define each product to address specific needs for each market segment.

## Step 16: Getting Products to the Buyer

Now that you have a customer and product in mind, your next task is to identify how to move or distribute products from your farm to the customer's house or store shelves. Distribution strategies typically describe:

- Location – Where will you sell your product?
- Distribution – Which sales channels will your product follow?
- Transportation – How will your product reach the buyer?

## Step 17: Setting the Price

In general, pricing strategies are based on two factors: Prevailing market prices and your costs. In the long run, your price has to cover your full costs – including production, marketing and promotion – as well as a return for your time and investment. Try to identify prevailing market prices for similar products if they exist; learn about what customers are willing to pay and what prices your competitors charge. Also identify and document all your production, marketing and promotion costs. Decide how you want to price your product for each market segment. Do you want to undermine the competition by offering a lower price? Can you set a high price that reflects your quality image or market demand? Are you simply looking to cover costs? Do you have power to set a price? How sensitive is demand to price changes? Take all these aspects into consideration and try to establish a realistic price or price range for each product.

## Step 18: Promoting Your Products

Promotion is very important to gain product recognition among customers. Promotional strategies often are built around a “message.” The message that you deliver about your product or business is just as important as the product itself. Equally important is how and when you deliver that message through the use of advertising tools and media. Consider also the costs of each promotion method.

## Step 19: Revisit Your Objectives and Priorities

The first step in developing your agroforestry plan was to outline your initial objectives and priorities for your land-based business. Since then, you have gathered considerable amounts of

information that will likely change at least some of those original goals. Record your revised objectives and priorities in the space provided in the Workbook.

## Step 20: Detailed ‘Best Bets’ Crop Information

To develop the most functional and profitable agroforestry practices, you should know as much as possible about each plant you intend to grow. You will have gathered much of this information while filling out your Workbook, using your land assessment, plant inventory (where appropriate), market research, Appendices 2 and 3 of the Training Manual, and possibly your own additional research.

Important information includes the biological requirements of each plant, the agroforestry practices they can be grown in, what other plants (and animals) they are compatible with, labor requirements for harvesting, potential volumes, value-added opportunities, and useful market information.

The table provided in the Workbook may include categories of information you do not have. You can exclude these or take extra time to find the information. There is also extra space for additional information you consider important but not specifically listed here.

## Step 21: Designing Your Agroforestry Practices

Now is the time to arrange your plants into agroforestry practices that best meet the management objectives you outlined in Step 19. The information on each plant crop, and the management information provided earlier in this chapter, will allow you to design and manage agroforestry practices that best meet your objectives. Fill in a table in the Workbook for each agroforestry practice you intend to develop.

**Note:** Remember that price and marketability are not the only criteria for selection of the plants you will include in your agroforestry practices. Some plants may be chosen because they provide valuable ecological functions to your agroforestry practice, such as trees for shade and windbreaks, or legumes for nitrogen fixation.



# Building an Agroforestry Development Plan

The purpose of building an agroforestry development plan is to create a schedule of the work that needs to be done in the years ahead to fully develop your agroforestry area(s). Your completed Agroforestry Development Plan will include specific tasks, timelines and labor projections for each agroforestry practice on a year-by-year basis. You will need a Development Plan for each agroforestry development area. The Development Plan is the final step in your Workbook, and will form the practical basis for your agroforestry development. You will no doubt change and adapt your work projections in the years ahead, but a good Development Plan will form a clear starting point and help focus your management efforts.

## ***The Development Plan includes two distinct parts:***

- A five-year plan outlining specific tasks for each agroforestry practice.
- A yearly activity plan, broken down into specific tasks for each month.

## Step 22: A Five-Year Management Projection

Your five-year management projection is a schedule of the work you plan to undertake in the next five years to develop your agroforestry practices. The specific tasks and timelines you prepare will form the basis for your yearly activity schedule.

Don't worry too much about getting absolutely everything right on the first pass. Your plans will change over time and you can go back and adjust your projections accordingly. For now, you are mainly interested in conceptualizing the overall operation on paper.

## ***The five-year management projection has four sections:***

- Area: Size of the area to be managed.
- Practice: Agroforestry practice and its associated products.
- Year: Year that you want the management activity to take place.

- **Management Objective:** Specific objective you hope to accomplish.

Use the template provided in the Workbook to create your own five-year management projection.

## Step 23: Yearly Activity Schedule

The yearly activity schedule describes specific tasks that need to be done, when and by whom. This is the document you will use to plan your work schedule on a month-by-month basis. A good yearly activity schedule will allow you to identify potential time and business conflicts, and ensure you avoid overlapping seasonal activities that could create shortages of labor and resources.

***A yearly activity schedule – one for each agroforestry practice – has five sections:***

- **Crop Plant:** The plants that you have decided you can grow and market.
- **Management Objectives:** A record of objectives, transferred from your five-year projection.
- **Task and Time of Year:** A list of specific tasks that must be accomplished to achieve each objective, including timelines associated with each task.
- **Materials:** Estimates of seed, seedlings, fertilizer, fencing, animals, feed and other items necessary for corresponding tasks.
- **Labor and Equipment:** A record of labor and equipment needs (if any) for each of the specific tasks.

Like the five-year management projection, your yearly activity schedule will likely change as you learn more. Remember to leave yourself plenty of time to complete all the work. As landowners well know, most tasks take longer than expected. The yearly activity schedule will also be helpful in costing the materials, labor and equipment necessary for the cash flow projection of your business plan. For details on business planning, refer to *Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses*. The information in the Workbook will provide a good basis for a business plan that includes a comprehensive cash flow projection.

# Planning for Agroforestry Workbook

## **Personal Assessment**

Step 1: Initial Objectives and Priorities

Step 2: Evaluate Personal Resources

## **Biophysical Site Assessment**

Step 3: Identify Current Land Uses

Step 4: Map Area(s) for Agroforestry Development

Step 5: Climate Assessment

Step 6: Soil Assessment

Step 7: Physical Features (Terrain)

Step 8: Timber and Non-Timber Forest Crop Inventory

## **Agroforestry Development Ideas**

Step 9: Agroforestry Ideas – Brainstorming

Step 10: Listing ‘Best Bets’

## **Evaluate the ‘Best Bets’ in the Context of the Industry**

Step 11: SWOT Analysis

Step 12: Porter Five Forces Model

Step 13: Revising Your ‘Best Bets’

## **Marketing Strategy for ‘Best Bets’**

Step 14: Select and Describe Target Market(s)

Step 15: Adding Value to Products

Step 16: Getting Products to the Buyer

Step 17: Setting the Price

Step 18: Promoting Your Products

## **Agroforestry Practice Design and Management**

Step 19: Revisit Your Objectives and Priorities

Step 20: Detailed ‘Best Bets’ Crop Information

Step 21: Designing Your Agroforestry Practices

## **The Agroforestry Development Plan**

Step 22: A Five-Year Management Projection

Step 23: Yearly Activity Schedule

# Personal Assessment

## Step 1: Initial Objectives and Priorities

Rank (X) the following management objectives according to your land-use priorities (low, medium, high). Remember these objectives are a starting point, and you can (and probably will) modify them later. If possible, numerically rank the top five objectives for your agroforestry project (1=highest to 5=lowest priority).

Objective	Low	Medium	High	Top 5
A new source of income from unproductive land				
Reduce costs of current farm or forest operations				
Develop new source of long-term income (i.e., timber)				
Increase short-term income while awaiting long-term timber income				
Tax advantages				
Increase grazing opportunities				
Increase wildlife opportunities				
Undertake environmental improvements				
Access to governmental programs and cost-share				
Other				

# Personal Assessment

## Step 2: Evaluate Personal Resources

What resources – in addition to your land base – do you have that could be to put into your agroforestry development? The section below allows you to list and evaluate the resources of all the family members who will be involved and that you think will have an impact on your ability to develop this agroforestry area.

Resource	Landowner use and potential of resource
<b>1. Management time</b> – When will the new activity not be in conflict with existing activities?	
<b>2. Labor</b> – Times of year when labor is most available.	
<b>3. Equipment and facilities</b> – For animals, storage, value-added processing, time of year available.	
<b>4. Specialized farm equipment</b> – Identify special farm equipment, such as tractors, ATVs, spray equipment, etc.	
<b>5. Irrigation</b> – Water source available.	
<b>6. Plant material</b> – Your own sources of seed, seedlings, cuttings and larger trees, or will you need to purchase them?	
<b>7. Livestock</b> – Cattle, sheep or other animals. What are their needs, and when are those greatest (i.e. calving)?	
<b>8. Materials</b> – Sawdust or shavings, manure and straw, or pine straw, for mulch, etc.	
<b>9. Other</b>	

# Exercise: Can I meet my labor and management needs?

	Total hours for year	Distribution of hours (for one year or for production period)			
		Jan-Mar	Apr-June	July-Sept	Oct-Dec
Suggested hours, full-time worker (~ 40 hours/week)	2,000	500	500	500	500
My estimate, cost of wages, full-time worker (\$7.25/hr. min. wage – in 2013)					
Labor and management hours available					
Principal Manager					
Team Member 1					
Team Member 2					
Team Member 3					
Hired Labor					
Total Hours Available					
Direct labor and management hours needed by enterprise					
Enterprise 1					
Enterprise 2					
Enterprise 3					
Total labor hours needed					
Total labor hours available (from above)					
Additional labor hours required (total hours needed minus total hours available)					
Excess labor hours available (total hours available minus total hours needed)					

# Biophysical Site Assessment

## Step 3: Identify Current Land Uses

List present uses of each part of your land and the products you harvest. Possibilities include: residential, recreation, farming (which crop), grazing (type of livestock), timber production, non-timber production, wildlife areas and green belts.

Land Use	Product/Resources Available
1. Residential	
2. Recreation	
3. Farming (list crops)	
4. Grazing Livestock (type)	
5. Timber Production	
6. Non-Timber Production	
7. Wildlife Areas	
8. Green Belts	
9. Other	

# Exercise: Inventory your land and natural resources

## *Agricultural land resources: Cropland and pasture*

**Who can help?** Your local extension agent or NRCS (Natural Resource Conservation Service) office can look at your property, indicate whether your present farm-management plan is sound, and recommend other options that could enhance your operation. Cost share programs or the sale of your agricultural development rights are other options that may be of value to you.

Number of acres of tillable land \_\_\_\_\_

Number of acres of pasture \_\_\_\_\_

Number of acres left idle \_\_\_\_\_

Number of acres you farm \_\_\_\_\_

Number of acres rented \_\_\_\_\_

Current crop(s) \_\_\_\_\_

Number of head of livestock \_\_\_\_\_

Total annual rental income from land rented to others who grow crops \_\_\_\_\_

Total annual rental income from land rented to others who raise livestock \_\_\_\_\_

Fertility of land, agricultural crops: ☐Excellent ☐Good ☐Poor

Fertility of land, forests: ☐Excellent ☐Good ☐Poor

Total annual income from pasture and livestock \_\_\_\_\_

How much of the annual pasture and livestock income is from land rented to others? \_\_\_\_\_ Rented from others? \_\_\_\_\_

Total annual income from cropland \_\_\_\_\_

How much of the annual cropland income is from land rented to others? \_\_\_\_\_ Rented from others? \_\_\_\_\_



# Exercise: Inventory your land and natural resources, con't

## *Natural resources*

**Forest. Who can help?** You may want to contact a state forester to assist you with the inventory and evaluation of your forest resources. He or she can advise you on the procedure for developing a forest stewardship plan. In some states, a state forester can help you prepare a forest stewardship plan. In all states, they can provide names of private consultant foresters to assist with a timber sale or assess the potential of your forest under different management options.

Total number of acres of forest \_\_\_\_\_

Three most common tree species (oak, poplar, pine, hickory, etc.)

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Do you have a written forest management plan? \_\_\_\_\_

If yes, what year was it prepared? \_\_\_\_\_

Have your property taxes been reduced because you are enrolled in a land-use-tax assessment program for forestry? \_\_\_\_\_

What nontimber forest products, if any, are present on the property? (Include edible and medicinal plants, decorative or floral products, specialty wood products, and native wild plants.)

Have you or has a past owner sold timber to a commercial timber harvester?

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If yes, when? \_\_\_\_\_ How many acres? \_\_\_\_\_

(Developing a forest stewardship plan will provide the information to answer the last two questions.)

## Exercise: Inventory your land and natural resources, con't

How many acres of forest could a commercial operator potentially harvest during the next five years? \_\_\_\_\_

Within the next five years, what is the estimated income from a commercial timber harvest(s) that is compatible with your forest stewardship objectives?

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### **Wildlife**

**Who can help?** State wildlife biologists have limited time but may be able to visit and discuss options. Leasing the hunting rights is an option that could generate income to pay taxes or more. Investigate educational materials on hunting options and discuss them with your extension wildlife specialist. Also contact the U.S. Fish and Wildlife Service.

Are deer causing significant crop or forest damage?

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Are other wildlife species causing crop damage? \_\_\_\_\_

If yes, what species?

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Do you have large numbers of geese on your property?

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Do you have quail or pheasant on your property?

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Do you have wild turkeys on your property?

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What other type of wildlife have you seen on the property?

---

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## Exercise: Inventory your land and natural resources, con't

What type of habitat improvements could be made to attract the wildlife you are interested in introducing to the property (timber harvesting, food plots, tree planting, etc.)?

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Do you or other family members hunt on the property?

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Do neighbors or other local residents now hunt on the property, with or without permission? \_\_\_\_\_

Do existing hunters pay you for the right to hunt on the property?

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If yes, how much are you paid a year? \_\_\_\_\_

List any unique wildlife habitats or species on your property (e.g., forest ponds, wetlands, old forests, caves).

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### *Aesthetic or intangible resources*

List locations on your property that have aesthetic appeal and could be developed for recreational enterprises, such as vacation cabin or hunting camp. Unique locations include rivers, streams, scenic overlooks, rock cliffs and wetlands.

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# Exercise: Inventory your land and natural resources, con't

## *Water resources*

If you have more than one pond, or spring, assess each.

**Who can help?** For assistance with evaluating your water resources, you may want to contact your local cooperative extension office. An extension agent should be able to direct you to a water-quality specialist in your area.

**Ponds.** Pond size (in acres) \_\_\_\_\_

Maximum pond depth (in feet) \_\_\_\_\_

Maximum summer water temperature at 2 feet \_\_\_\_\_

pH \_\_\_\_\_

Alkalinity (in parts per million) \_\_\_\_\_

What type of fish live in the pond? \_\_\_\_\_

Do livestock have full access to the pond? \_\_\_\_\_

Does livestock waste drain into the pond? \_\_\_\_\_

**Streams/Rivers.** Stream width \_\_\_\_\_

Stream depth \_\_\_\_\_

Does the stream run all year? \_\_\_\_\_

What type of fish live there? \_\_\_\_\_

Do livestock use the stream or does livestock waste run into the stream? \_\_\_\_\_

Is the stream bordered by forest of at least 25 feet in width along each side? \_\_\_\_\_

**Springs.** Number of springs on the property \_\_\_\_\_

Rate of flow of largest spring (gallons per hour) \_\_\_\_\_

# Exercise: Inventory your physical and personal resources

## *Buildings, houses, barns and other structures*

List size, age, condition and the cost to convert or upgrade structures for use in the enterprise.

House

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---

Barn 1

---

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Barn 2

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Other

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List rental cost and location of any available public or private structures or facilities that you can use for your enterprise (e.g., kitchen, storage facility, or processing facility).

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## *Machinery and equipment*

For each piece of equipment (tractor, chainsaw, wagon, rototiller, backhoe, bulldozer, etc.), list make, horsepower, age, condition, attachments, or other relevant information.

1. 

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2. 

---
3. 

---
4. 

---
5. 

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# Exercise: Inventory your physical and personal resources, con't

## *Use of byproducts of farm/forest operation*

Is animal manure produced from the farm operation? \_\_\_\_\_

Can it be used onsite? \_\_\_\_\_

List other byproducts, if any, from farm operations

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Can they be used onsite? \_\_\_\_\_

How and where?

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Are limbs and other wood from a recent timber harvest currently available for use? \_\_\_\_\_

What is the type and quantity of this material (e.g., cords of firewood that it would produce and number and species of vines)?

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## *Labor and management resources*

Time for management and labor involved in an enterprise must come from the team members or from outside sources. The opposite chart will help team members determine how much time they have available during each quarter of the year for management and labor activities. The time available can be on weekends or weekdays. Completing the chart will help you look at your time realistically and determine whether the enterprises you are investigating are compatible with the time you have available.

# Exercise: Inventory your physical and personal resources, con't

Resource person	Hours by season and time of the week				
	Total hours avail/year	Jan-Mar Weekday/Weekend	Apr-June Weekday/Weekend	July-Sept Weekday/Weekend	Oct-Dec Weekday/Weekend
Management/labor					
Labor					
Potential labor sources outside team					

# Exercise: Inventory your physical and personal resources, con't

## *Financial resources*

How much startup money can you raise by using personal or family resources? \_\_\_\_\_

Where will the startup money come from (e.g. personal savings, family member, farm credit, bank, cooperative)?

\_\_\_\_\_

\_\_\_\_\_

Do you plan to borrow money from a bank for the enterprise?

\_\_\_\_\_

Is there a grant program that could provide some startup money?

\_\_\_\_\_



# Exercise: Inventory your physical and personal resources, con't

## Special skills that are commonly overlooked

If you or any of your team members have any of the following skills or experience, fill in the names. Also, add the names of relevant agencies or organizations with which you or your team members may have connections (such as cooperative extension, university agricultural experiment stations, the U.S. Department of Agriculture, state department of agriculture, and state forestry agencies).

Relevant experience	Name of person	Short description of skill/experience
Marketing skills		
Computer skills		
Production skills		
Sales ability		
Special skills, such as innovative thinking		
Other (list skill)		

# Biophysical Site Assessment

## Step 4: Map Area(s) for Agroforestry Development


Using the legend, draw a sketch map of your agroforestry development area in the space below. This map will be used to mark the locations of areas that have various advantages and limitations. Note key reference points, such as roads, boundaries and buildings, and include:






















**Existing land uses** – such as crop fields, pastures, stands of trees

**Be sure to label** with a scale and orientation arrow

**Physical features** – like steep slopes, rock outcrops, streams and ponds

Scale ]-----[

Orientation 

 road	 windbreak	 quarry	 debris pile
 property boundary	 building	 plantation	 swamp
 fence	 access road	 marsh	 orchard
 brush	 grass/abandoned field	 bridge	Scale: _____
 woodland area	 hydroline	 steep slope	
 watercourse	 railway	 shallow & rocky	

# Biophysical Site Assessment

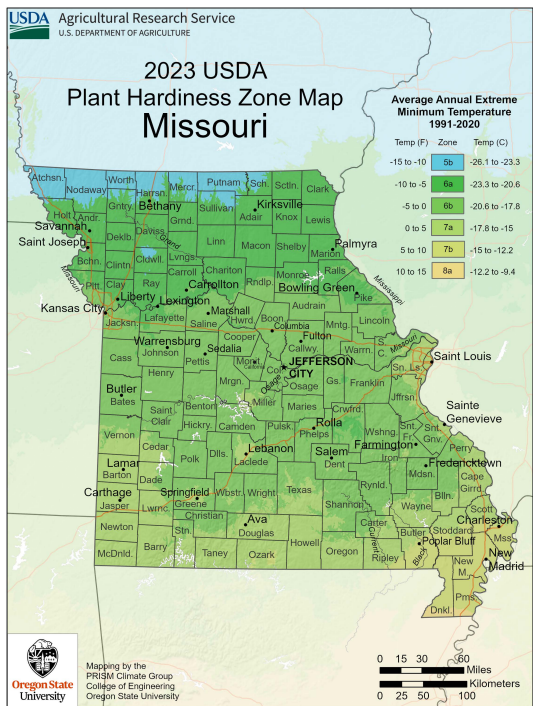
## Step 5: Climate Assessment

Simply stated, the site assessment provides an overall measure of a land area’s ability to support, or grow, a desired plant. Therefore, as a part of this assessment, the biological areas that will be considered include the climate, the soils and the land’s physical features, sometimes called the topography or terrain.

Development Area	
Hardiness Zone: Include frost-free days, first and last frosts (see heat zone map on the next page).	
Indicator Plants	
Other Useful Climate Information: <ul style="list-style-type: none"><li>- Mean annual rainfall</li><li>- Mean annual snowfall</li><li>- Average temperatures</li><li>- Open ground: Average date of spring thaw and fall freeze</li></ul>	

# Biophysical Site Assessment

## Step 5: Climate Assessment, con't



### USDA Hardiness Zones and Average Annual Minimum Temperature Range

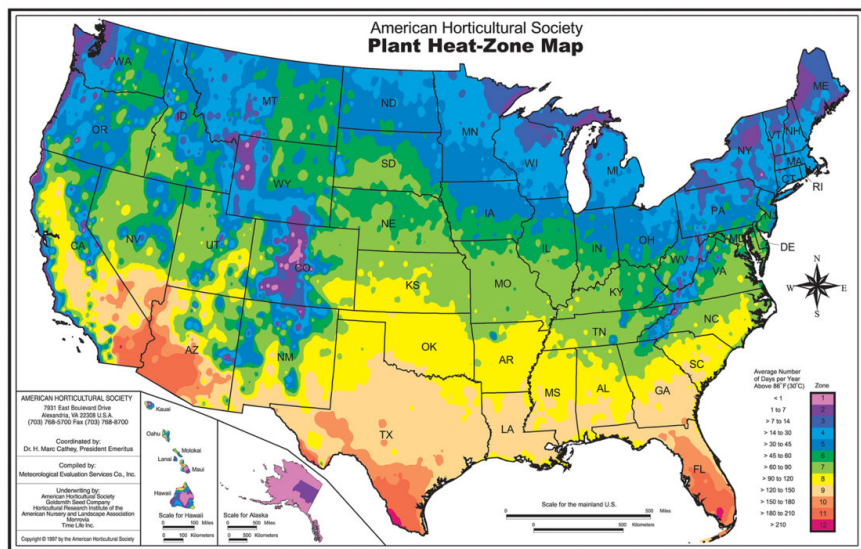
	Fahrenheit	Celsius	Example Cities
4a	-30 to -25 F	-34.4 to -31.7 to C	Fargo, North Dakota; Caribou, Maine
4b	-25 to -20 F	-31.7 to -28.9 C	Brookings, SD; Great Falls, MT
5a	-20 to -15 F	-28.9 to -26.1 C	Minneapolis/St. Paul, MN
5b	-15 to -10 F	-26.1 to -23.3 C	Concord, NH; Des Moines, IA; Cheyenne, WY
6a	-10 to -5 F	-23.3 to -20.6 C	Lansing, MI; Springfield, IL
6b	-5 to 0 F	-20.6 to -17.8 C	Topeka, KS; Columbus, OH; Jefferson City, MO
7a	0 to 5 F	-17.8 to -15 C	Charleston, WV; St. Louis, MO; Amarillo, TX
7b	5 to 10 F	-15 to -12.2 C	Oklahoma City, OK

# Biophysical Site Assessment

## Step 5: Climate Assessment, con't

### AHS Plant Heat-Zone Map

The 12 zones of the map indicate the average number of days each year that a given region experiences “heat days” – temperatures over 86 degrees (30 degrees Celsius). That is the point at which plants begin suffering physiological damage from heat. The zones ranges from Zone 1 (less that one heat day) to Zone 12 (more than 210 heat days). Please note the data for this map has not been updated as recently as the USDA Plant Hardiness Zone Map on page 43.



### Average number of days annually over 86°F:

ZONE 1: -1

ZONE 2: 1-7

ZONE 3: 7-14

ZONE 4: 14-30

ZONE 5: 30-45

ZONE 6: 45-60

ZONE 7: 60-90

ZONE 8: 90-120

ZONE 9: 120-150

ZONE 10: 150-180

ZONE 11: 180-210

ZONE 12: 210+

# Biophysical Site Assessment

## Step 6: Soil Assessment

This area is for notes about the soil(s) present on specific areas of the sketch map. You should include information that is directly useful to your agroforestry development. Photocopy the table below if you are assessing more than one development area.

Development Area	Soil Type(s) if Known
1. Soil texture and composition: Sand and gravel, loam, silt and clay, organic layer (depth).	
2. Soil depth: Include rock outcroppings and hardpan (depth of soil cover), rockiness.	
3. Soil moisture: Particular note of wet areas and flooding (with time of year).	
4. Soil nutrients: pH, salinity, fertility (attach soil reports).	
5. Aspect: Especially south vs. north facing.	
6. Terrain relief: Slope, steepness, gullies.	
7. Soil stability: Presence of high risk indicators such as sheet, rill or gully erosion.	
8. Frost pockets.	
9. Roots, stumps and other debris in or on soil.	

# Biophysical Site Assessment

## Step 7: Physical Features (Terrain)

There are a number of physical features, or topography characteristics, that can influence the capability of your land to produce particular crops on a site. Because physical features are often closely related to soil characteristics, the information you obtain for each of your agroforestry development areas should be entered into the same table as the information from Step 6: Soil Assessment.

In combination, the terrain relief and aspect create a lay of the land that often will enhance the opportunities for a successful agroforestry practice. By listing unique land features you will be better able to place practices and plant species to the landscape to best ensure their survival and growth. For example, slope is very important in relation to the moisture available for plant growth. In general, north-facing slopes will have better moisture than south-facing slopes that are typically drier.

# Biophysical Site Assessment

## Step 8: Timber and Non-Timber Forest Crop Inventory

In addition to telling you what products you might have for sale, the number and quality of plants revealed by your vegetation inventory will provide additional information on site conditions. Photocopy and fill in for each development area.

### Timber Inventory Summary

Development area:

Area (ac):

Plot #s:

Plot Area (ft<sup>2</sup>):

Plots/ac:

Tree Inventory					
Tree species	Percentage of each	Age (opt'l)	Height (opt'l)	Crown closure (%age)	Density (trees/ha)



# Biophysical Site Assessment

## Step 8: Timber and Non-Timber Forest Crop Inventory

In addition to telling you what products you might have for sale, the number and quality of plants revealed by your vegetation inventory will provide additional information on site conditions. Photocopy and fill in for each development area.

### Non-Timber Inventory Summary

Development area:

Area (ac):

Plot #s:

Plot Area (ft<sup>2</sup>):

Plots/ac:

Non-Timber Inventory					
Harvestable species	Total # of plants (ea. species)	Cover (%) (ea. species)	Harvest-able vs. non (%)	Size of plants	Info on plants outside plots

# Agroforestry Development Ideas

## Step 9: Agroforestry Ideas – Brainstorming

List your agroforestry ideas separately for each development area. An additional category (Associated Practices) is provided for systems that are not real agroforestry systems, such as hybrid poplar plantations.

Development Area	Agroforestry Ideas
1. Forest Farming	
2. Alley Cropping	
3. Silvopasture	
4. Riparian Forest Buffers	
5. Windbreaks	
6. Associated Practices (e.g., Poplar plantations)	
7. Wildlife Areas (e.g., increase quail habitat, lease hunting)	
8. Other ideas for integrating forest practices on the farm	

# Exercise: Assessing my resources, goals and possible enterprises

*1. Describe the long- and short-term goals that you and your team hope to achieve by starting this new enterprise.*

*(a) Long-term goals*

- 1.
- 2.

*(b) Short-term goals*

- 1.
- 2.

*2. List the family members or team members who want to be actively involved. Describe each person's responsibilities.*

*3. Specify how much time each week you and your teammates will have available to spend on your new enterprise.*

*4. How much money can each team member provide now to initiate the enterprise?*

## Exercise: Assessing my resources, goals and possible enterprises, con't

*(Read and fill in number 5 only if you currently run a natural resources-based enterprise; otherwise, go to number 6).*

**5. Check the responses that best characterize your business goals during the next 3 to 5 years for your current enterprise. Answer any follow-up questions.**

☐ **Maintain at about the same level as in the past**

---

☐ **Expand. How?**

---

☐ **Get out altogether. Why?**

---

☐ **Other:**

---

**6. The following information will help you determine your financial goals for any current or new enterprise. List the yearly income (you and your family or teammates) expect from the sources listed below:**

**Current farm/forest enterprises**

---

**New enterprise (once it is established)**

---

**Non-natural-resource employment (current job)**

---

**Other**

---

**TOTAL**

---

# Agroforestry Development Ideas

## Step 10: Listing ‘Best Bets’

The list you make in this step should include all the plants that can grow on your land, and the products that can be derived from them. This list represents a summary of the information you have gathered so far. Photocopy the table below if you are assessing more than one development area.

It is also very useful to consider which Government (State and Federal) Programs are available to provide funding incentives for a broad range of agroforestry activities, from practice establishment through value-added and product marketing.



# Exercise: What will it take to produce my product or service?

You will probably have to make some capital purchases, such as buying buildings, equipment or land and making major improvements, to start your new business. List the capital purchases and their costs.

What will be your major production tasks, such as planting, harvesting, building, advertising, sales and maintenance? Describe the tasks according to the month they should occur. Also indicate which months you expect to receive income.

Month	Task
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

# Exercise: Relative merits of various enterprise ideas

Criteria	Enterprise ideas*				
Total					

*\*Rated on a scale of 1 to 10, with 1 being least compatible and 10 being most compatible*

## Example EXERCISE for Smiths: Relative merits of various enterprise ideas

Criteria	Enterprise ideas*				
	Shiitake	Grape-vine wreaths	Hunting lease	Ginseng	Aqua-culture
Compatible with residency status	10	10	7	10	10
Preferred by family	9	6	7	9	3
Meets financial goals	9	9	5	10	9
Uses underused physical resources	4	9	8	6	8
Uses management/ labor resources	8	6	5	3	6
Potential market exists	10	5	9	10	6
Uses farm, forest byproducts	9	9	3	7	5
Family financial resources avail.	10	8	10	4	8
TOTAL	69	62	54	59	55

*\*Rated on a scale of 1 to 10, with 1 being least compatible and 10 being most compatible*



# Evaluate the ‘Best Bets’ in the Context of the Industry

## Step 11: SWOT Analysis

Start the evaluation with an assessment of internal factors (strengths and weaknesses) and external factors (opportunities and threats). (Refer to the Training Manual, Chapter 9 – Marketing Principles for this exercise)

Internal Factors	External Factors
Strengths	Opportunities
Weaknesses	Threats

# Evaluate the ‘Best Bets’ in the Context of the Industry

## Step 12: Porter Five Forces Model

Identify potential barriers to entry, information about suppliers and buyers, competition and substitute products, and summarize the information in the following worksheet. (Refer to the Training Manual, Chapter 9 – Marketing Principles for this exercise)

<b>Potential entrants (Barriers to entry)</b>
<b>Suppliers – Bargaining power of suppliers</b>
<b>Buyers – Bargaining power of buyers</b>

## Evaluate the 'Best Bets' in the Context of the Industry

## Step 12: Porter Five Forces Model, con't

[illegible]



# Exercise: Identify suppliers and supply availability

Development Area	Available Government Incentive Programs:		
Crop/Product	Supply Needed	Supplier	Information about supply (quality, availability)

# Exercise: Identify buyers and their needs

Development Area	Available Government Incentive Programs:	
Crop/Product	Buyer (and reasons)	Buyer needs

# Exercise: Identify substitute products

Development Area	Available Government Incentive Programs:		
Crop/Product	Unique characteristics of product	Substitute product	Unique characteristics of substitute product

# Exercise: Researching the competition

Development Area	Available Government Incentive Programs:	
Crop/Product	Competitor	Competitor Info



# Evaluate the ‘Best Bets’ in the Context of the Industry

## Step 13: Revising Your ‘Best Bets’

List your revised ‘best bets’ in the table below, based on what you know about the marketing potential of the plants listed. This list will form the basis for your in-depth market research. Photocopy the table if you are assessing more than one development area.

Development Area	Available Government Incentive Programs:	
‘Best Bet’ Plants	Marketable Products	Volumes (indicate when available)

# Marketing Strategy for ‘Best Bets’

## Step 14: Select and Describe Target Market(s)

Complete this worksheet for each major product you plan to produce. Develop a profile of the customer(s) you intend to target by market segment. (Refer to the Training Manual, Chapter 9 – Marketing Principles for this exercise)

Development Area	Available Government Incentive Programs:		
Product			
Customer Segment	1.	2.	3.
Geographic			
Demographic			
Psychographic			
Needs/ Preferences			

# Marketing Strategy for ‘Best Bets’

## Step 15: Adding Value to Products

List the ‘pros’ and ‘cons’ of each value-added activity you are considering. Photocopy the table below if you are assessing more than one development area.

Development Area	Available Government Incentive Programs:		
Plant/Product	Value-Added Opportunity	‘Pros’	‘Cons’

# Marketing Strategy for ‘Best Bets’

## Step 16: Getting Products to the Buyer

Use the table below to outline how you will get each of your products to buyers. The three main factors to consider are:

- 1. **Location:** Where will you sell your product?
- 2. **Distribution:** Which sales channels will your product follow?
- 3. **Transportation:** How will your product reach the buyer?

Photocopy the table below if you are assessing more than one development area.

Development Area	Available Government Incentive Programs:		
Product	Location	Distribution	Transportation

# Marketing Strategy for ‘Best Bets’

## Step 17: Setting the Price

For each product on your ‘best bets’ list, establish a realistic price or price range. Photocopy the table below if you are assessing more than one development area.

Development Area	Available Government Incentive Programs:		
Product	Price Range	Product	Price Range

# Marketing Strategy for ‘Best Bets’

## Step 18: Promoting Your Products

Complete this worksheet for each major product you plan to produce. Choose a promotion approach for each customer segment. (Refer to Chapter 9 – Marketing Principles for this exercise)

Development Area	Available Government Incentive Programs:		
Product			
Customer Segment	1.	2.	3.
Message			
Tools			
Frequency			
Cost			

# Agroforestry Practice Design and Management

## Step 19: Revisit Your Objectives and Priorities

List your top five land management goals (see original objectives listed in Step 1):

Top Five Land Management Goals:
1.
2.
3.
4.
5.

# Agroforestry Practice Design and Management

## Step 20: Detailed ‘Best Bets’ Crop Information

Use the table to summarize everything you know about each plant you plan to grow in one agroforestry development area. You can photocopy the table below so that you have one for each crop plant.

<b>Crop Plant:</b>	
<b>Agroforestry practice (best produced in)</b>	
<b>Where produced (in development area)</b>	
<b>Shade (requirement or tolerance)</b>	
<b>Soil and water (requirement or tolerance)</b>	
<b>Particular plant needs (to produce needed quantity and quality)</b>	
<b>Labor required to grow and harvest (amount and time of year)</b>	
<b>Resource use fit (time, labor and other resources with other activities)</b>	
<b>Compatible crop plants (can be grown with or should not be grown with)</b>	



# Agroforestry Practice Design and Management

## Step 20: Detailed ‘Best Bets’ Crop Information (con’t)

Crop Plant:	
Compatible livestock (animal and useful interaction)	
Harvest requirements (e.g., by hand, machine, cut tops, dig)	
Post-harvest requirements (e.g., storage, drying)	
Packaging and shipping requirements	
Cost to grow and harvest	
Product(s) on market	
Current market price	
Profit potential	

# Agroforestry Practice Design and Management

## Step 20: Detailed ‘Best Bets’ Crop Information (con’t)

Crop Plant:	
Volume (potential production)	
Grade standards in market	
Product influences and trends	
Value-added opportunities	
Other	

# Agroforestry Practice Design and Management

## Step 21: Designing Your Agroforestry Practice

Depending on the size of your operation, you may be able to put your entire development area on one table, or you may need several. Photocopy as required. You will want to create a separate table for each development area.

Development Area	Available Government Incentive Programs:	
Crop Plant(s)	Agroforestry Practice	Management Required (to grow marketable quality)

# The Agroforestry Development Plan

## Step 22: A Five-Year Management Projection

Using the information compiled in your Workplan, complete the following table. Depending on the size of your operation, you may wish to complete one table for each proposed system. Photocopy this table as required.

Development Area	Available Government Incentive Programs:		
Size of Area	Practice and Associated Crop	Year	Management Objectives

# The Agroforestry Development Plan

## Step 23: Yearly Activity Schedule

This table will represent the work you plan to do in the coming year to develop your agroforestry practice. You should fill in a table for each agroforestry practice. Photocopy as necessary. Be prepared to revise this schedule as necessary.

Agroforestry Practice	Government Incentive Program Special Requirements:			
Time of Year	Management Objective	Specific Tasks	Materials	Labor and Equipment

# Notes

# Notes

# Notes



# Notes



## The Center for Agroforestry University of Missouri

*A Global Center for Agroforestry, Entrepreneurship and the Environment*



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